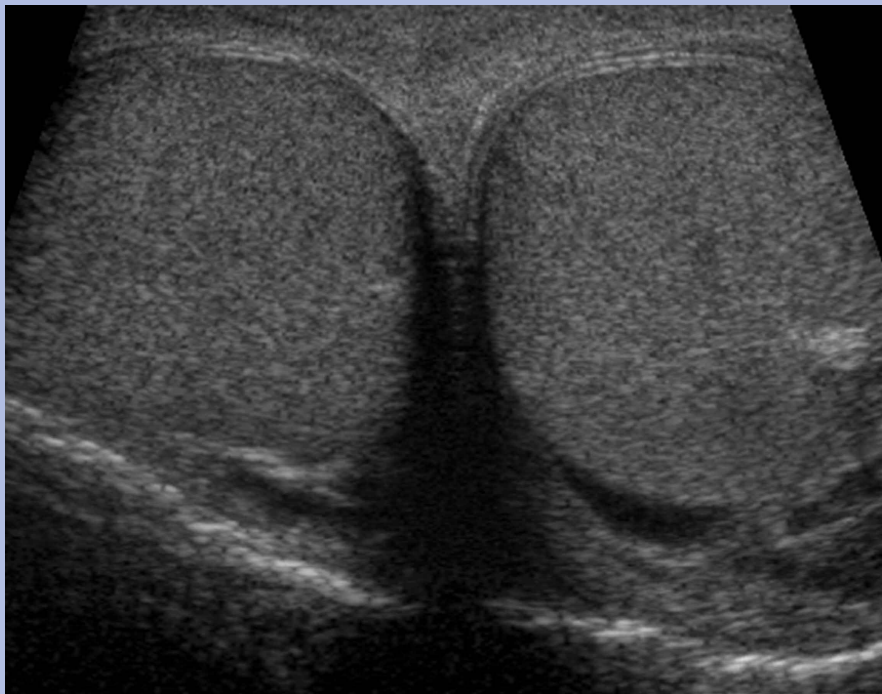


AIUM Practice Guideline for the Performance of Scrotal Ultrasound Examinations

*Guideline developed in collaboration with the American College of Radiology
and the Society of Radiologists in Ultrasound.*



© 2010 by the American Institute of Ultrasound in Medicine

The American Institute of Ultrasound in Medicine (AIUM) is a multidisciplinary association dedicated to advancing the safe and effective use of ultrasound in medicine through professional and public education, research, development of guidelines, and accreditation. To promote this mission, the AIUM is pleased to publish in conjunction with the American College of Radiology (ACR) and the Society of Radiologists in Ultrasound (SRU) this *AIUM Practice Guideline for the Performance of Scrotal Ultrasound Examinations*.

The AIUM represents the entire range of clinical and basic science interests in medical diagnostic ultrasound, and, with hundreds of volunteers, this multidisciplinary organization has promoted the safe and effective use of ultrasound in clinical medicine for more than 50 years. This document and others like it will continue to advance this mission.

Practice guidelines of the AIUM are intended to provide the medical ultrasound community with guidelines for the performance and recording of high-quality ultrasound examinations. The guidelines reflect what the AIUM considers the minimum criteria for a complete examination in each area but are not intended to establish a legal standard of care. AIUM-accredited practices are expected to generally follow the guidelines with recognition that deviations from these guidelines will be needed in some cases, depending on patient needs and available equipment. Practices are encouraged to go beyond the guidelines to provide additional service and information as needed.



14750 Sweitzer Ln, Suite 100
Laurel, MD 20707-5906 USA
800-638-5352 • 301-498-4100
www.aium.org

I. Introduction

The clinical aspects contained in specific sections of this guideline (Introduction, Indications, Specifications of the Examination, and Equipment Specifications) were developed collaboratively by the American Institute of Ultrasound in Medicine (AIUM), the American College of Radiology (ACR), and the Society of Radiologists in Ultrasound (SRU). Recommendations for physician requirements, written request for the examination, procedure documentation, and quality control vary among the three organizations and are addressed by each separately.

These guidelines are intended to assist practitioners performing ultrasound studies of the scrotum. In some cases, additional and/or specialized examinations may be necessary. While it is not possible to detect every abnormality, adherence to the following guidelines will maximize the probability of detecting most of the abnormalities that occur in the scrotum.

II. Qualifications and Responsibilities of the Physician

See the AIUM Official Statement *Training Guidelines for Physicians Who Evaluate and Interpret Diagnostic Ultrasound Examinations* and the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

III. Indications

Indications for scrotal ultrasound include but are not limited to:

1. Evaluation of scrotal pain, including but not limited to testicular trauma, ischemia/torsion, and infectious or inflammatory scrotal disease.
2. Evaluation of palpable inguinal, scrotal, or scrotal masses.
3. Evaluation of scrotal asymmetry, swelling, or enlargement.
4. Evaluation of potential scrotal hernias.
5. Detection/evaluation of varicoceles.
6. Evaluation of male infertility.
7. Follow-up of prior indeterminate scrotal ultrasound findings.
8. Localization of undescended testes.

9. Detection of occult primary tumors in patients with metastatic germ cell tumors.
10. Follow-up of patients with prior primary testicular neoplasms, leukemia, or lymphoma.
11. Evaluation of abnormalities noted on other imaging studies (including but not limited to computed tomography, magnetic resonance imaging, and positron emission tomography).
12. Evaluation of intersex conditions.

IV. Written Request for the Examination

The written or electronic request for an ultrasound examination should provide sufficient information to allow for the appropriate performance and interpretation of the examination.

The request for the examination must be originated by a physician or other appropriately licensed health care provider or under their direction. The accompanying clinical information should be provided by a physician or appropriate health care provider familiar with the patient's clinical situation and should be consistent with relevant legal and local health care facility requirements.

V. Specifications of the Examination

The testes should be evaluated in at least 2 planes: longitudinal and transverse. Transverse images should be obtained in the superior, mid, and inferior portions of the testes. Longitudinal views should be obtained centrally as well as medially and laterally. Each testis should be evaluated in its entirety, as should the epididymis (head, body, and tail) when technically feasible. The size and echogenicity of each testis and epididymis should be compared to the contralateral side. Comparison of the testes, including gray scale and color Doppler imaging, is best accomplished with a side-by-side transverse image. Scrotal skin thickness should be evaluated. If a palpable abnormality is the indication for the sonogram, this area should be directly imaged.

Relevant extratesticular structures should be evaluated. Additional techniques such as the Valsalva maneuver or upright positioning can be used as needed. Any abnormality should be documented.

Doppler sonography (spectral and color/power Doppler imaging) should be used as necessary in all examinations of the scrotum, particularly in the setting of acute scrotal pain. If used, color and/or power Doppler sonography should include at least 1 side-by-side image comparing both testes and 2 images with identical Doppler settings to evaluate symmetry of flow. Low-flow detection settings should be used to document testicular blood flow, and the transducer frequency should be optimized for maximum Doppler sensitivity while maintaining adequate penetration. If flow cannot be demonstrated on color Doppler imaging, power Doppler imaging, if available, should be used to increase flow sensitivity.

VI. Documentation

Adequate documentation is essential for high-quality patient care. There should be a permanent record of the ultrasound examination and its interpretation. Images of all appropriate areas, both normal and abnormal, should be recorded. Variations from normal size should be accompanied by measurements. Images should be labeled with the patient identification, facility identification, examination date, and side (right or left) of the anatomic site imaged. An official interpretation (final report) of the ultrasound findings should be included in the patient's medical record. Retention of the ultrasound examination should be consistent both with clinical needs and with relevant legal and local health care facility requirements.

Reporting should be in accordance with the *AIUM Practice Guideline for Documentation of an Ultrasound Examination*.

VII. Equipment Specifications

Scrotal studies should be conducted with a real-time scanner, preferably using a 7- to 14-MHz linear array transducer. A curvilinear or vector transducer with lower frequencies may be needed if the scrotum is enlarged, recognizing that there is a trade-off between resolution and beam penetration. The highest possible Doppler frequencies (typically in the 5- to 10-MHz range) providing optimal resolution and flow detection should be used. The Doppler frequency may differ from the imaging frequency. Standoff pads can be used, if necessary, to improve imaging.

VIII. Quality Control and Improvement, Safety, Infection Control, and Patient Education

Policies and procedures related to quality control, patient education, infection control, and safety should be developed and implemented in accordance with the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

Equipment performance monitoring should be in accordance with the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

IX. ALARA Principle

The potential benefits and risks of each examination should be considered. The ALARA (as low as reasonably achievable) principle should be observed when adjusting controls that affect the acoustic output and by considering transducer dwell times. Further details on ALARA may be found in the AIUM publication *Medical Ultrasound Safety, Second Edition*.

Acknowledgments

This guideline was revised by the American Institute of Ultrasound in Medicine (AIUM) in collaboration with the American College of Radiology (ACR) and the Society of Radiologists in Ultrasound (SRU) according to the process described in the *AIUM Clinical Standards Committee Manual*.

Collaborative Committee

ACR

Ruth B. Goldstein, MD, *Chair*
Nirvikar Dahiya, MD
Rick I. Feld, MD

AIUM

Michael C. Hill, MB
William D. Middleton, MD
Thomas C. Winter, III, MD

SRU

Brian D. Coley, MD
Vikram S. Dogra, MD
Sharlene A. Teefey, MD

AIUM Clinical Standards Committee

David M. Paushter, MD, *Chair*

Leslie Scoutt, MD, *Vice Chair*

Susan Ackerman, MD

Lisa Allen, BS, RDMS, RDCS, RVT

Mert Ozan Bahtiyar, MD

Harris L. Cohen, MD

Jude Crino, MD

Lin Diacon, MD, RDMS, RPVI

Judy Estroff, MD

Kimberly Gregory, MD, MPH

Charlotte Henningsen, MS, RT, RDMS, RVT

Charles Hyde, MD

Christopher Moore, MD, RDMS, RDCS

Olga Rasmussen, RDMS

Carl C. Reading, MD

Daniel Skupski, MD

Jay Smith, MD

Joseph Wax, MD

10. Hörmann M, Balassy C, Philipp MO, Pumberger W. Imaging of the scrotum in children. *Eur Radiol* 2004; 14:974–983.
11. Karmazyn B, Steinberg R, Kornreich L, et al. Clinical and sonographic criteria of acute scrotum in children: a retrospective study of 172 boys. *Pediatr Radiol* 2005; 35:302–310.
12. Ragheb D, Higgins JR Jr. Ultrasonography of the scrotum: technique, anatomy, and pathologic entities. *J Ultrasound Med* 2002; 21:171–185.
13. Sudakoff GS, Quiroz F, Karcaaltincaba M, Foley WD. Scrotal ultrasonography with emphasis on the extratesticular space: anatomy, embryology, and pathology. *Ultrasound Q* 2002; 18:255–273.
14. Woodward PJ, Sohaey R, O'Donoghue MJ, Green DE. From the archives of the AFIP: tumors and tumorlike lesions of the testis—radiologic-pathologic correlation. *Radiographics* 2002; 22:189–216.
15. Yang DM, Kim SH, Kim HN, et al. Differential diagnosis of focal epididymal lesions with gray scale sonographic, color Doppler sonographic, and clinical features. *J Ultrasound Med* 2003; 22:135–142.

Suggested Reading

Articles that are not cited in the document but that the committee recommends for further reading on this topic.

1. Akin EA, Khati NJ, Hill MC. Ultrasound of the scrotum. *Ultrasound Q* 2004; 20:181–200.
2. Baldisserotto M, de Souza JC, Pertence AP, Dora MD. Color Doppler sonography of normal and torsed testicular appendages in children. *AJR Am J Roentgenol* 2005; 184:1287–1292.
3. Basu S, Howlett DC. High-resolution ultrasound in the evaluation of the nonacute testis. *Abdom Imaging* 2001; 26:425–432.
4. Bhatt S, Dogra VS. Role of US in testicular and scrotal trauma. *Radiographics* 2008; 28:1617–1629.
5. Casalino DD, Kim R. Clinical importance of a unilateral striated pattern seen on sonography of the testicle. *AJR Am J Roentgenol* 2002; 178:927–930.
6. Dogra VS, Bhatt S. Acute painful scrotum. *Radiol Clin North Am* 2004; 42:349–363.
7. Dogra VS, Gottlieb RH, Oka M, Rubens DJ. Sonography of the scrotum. *Radiology* 2003; 227:18–36.
8. Dogra VS, Rubens DJ, Gottlieb RH, Bhatt S. Torsion and beyond: new twists in spectral Doppler evaluation of the scrotum. *J Ultrasound Med* 2004; 23:1077–1085.
9. Gorman B, Carroll BA. Scrotal sonography. In: Rumack CM, Wilson SR, Charboneau JW (eds). *Diagnostic Ultrasound*, 3rd ed. Chicago, IL: CV Mosby Co; 2005:849–888.